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CLAIMS:

1. A cryogenic refrigerator comprising:
a discharging port for pressure-feeding a refrigerant;
a suction port for sucking the refrigerant;
a pressure feeding means including the discharging port and the suction port;
a refrigeration means for refrigerating a body to be refrigerated;
a high pressure passage for establishing communication between the discharging port of the pressure feeding means and the refrigeration means, the high pressure passage being introduced with the refrigerant with relatively high pressure;
a low pressure passage for establishing the communication between the suction port of the pressure feeding means and the refrigeration means, the low pressure passage being introduced with the refrigerant with relatively low pressure; and
at least one heat exchanger at the high pressure passage for refrigerating the refrigerant introduced at the high pressure passage by heat exchange, the heat exchanger including an active pressure drop type heat exchanger for declining pressure of the refrigerant at the high pressure passage before being introduced into the refrigeration means; wherein
the active pressure drop type heat exchanger declines the pressure of the refrigerant with a ratio equal to or greater than 5 percent out of 100 percent and refrigerates the refrigerant when a pressure difference between a pressure of the refrigerant before being introduced into the active pressure drop type heat exchanger and a pressure of the refrigerant before being introduced into the refrigeration means is defined as 100 percent.
2. The cryogenic refrigerator according to Claim 1, wherein
the active pressure drop type heat exchanger is at least one of the plural heat exchangers arranged in series and positioned closest to the refrigeration means relative to a flow of the refrigerant.
3. The cryogenic refrigerator according to Claim 1, wherein the pressure of the refrigerant before being introduced into the active pressure drop type heat exchanger is determined to be 0.1-1000Mpa and the active pressure drop type heat exchanger declines a temperature of the refrigerant with a ratio equal to or greater than 5 percent when a temperature difference between a temperature of the refrigerant before being

introduced into the active pressure drop type heat exchanger at the high pressure passage and a temperature of the refrigerant before being introduced into the refrigeration means is defined as 100 percent.

4. The cryogenic refrigerator according to Claim 1, wherein the active pressure drop type heat exchanger includes a counterflow type heat exchanger for refrigerating the refrigerant at the high pressure passage by heat exchange with the refrigerant at the low pressure passage.

5. The cryogenic refrigerator according to Claim 1, further comprising:
a pre-cooling refrigerator; wherein
the high pressure passage includes a pre-cooling portion for pre-cooling the refrigerant at the high pressure passage with the pre-cooling refrigerator.

6. The cryogenic refrigerator according to Claim 5, wherein the pre-cooling refrigerator includes one of a pulse tube refrigerator, a Gifford McMahon refrigerator, a Solvay type cryogenic refrigerator, a Vilmier refrigerator, and a Stirling type cryogenic refrigerator.

7. The cryogenic refrigerator according to Claim 5, wherein the pressure feeding means supplies the refrigerant compressed to have a high pressure into the high pressure passage and into the high pressure passage of the pre-cooling refrigerator.

8. The cryogenic refrigerator according to Claim 1, further comprising:
a pressure drop passage in communication with the high pressure passage and for exchanging the heat with the heat exchange medium, the pressure drop passage provided at the active pressure drop type heat exchanger; wherein
the pressure drop passage includes a diameter determined to be 0.1-15 millimeters and a passage length determined to be 0.1-200 meters.

9. The cryogenic refrigerator according to Claim 1, wherein the active pressure drop type heat exchanger declines the pressure of the refrigerant with a ratio equal to or greater than 50 percent out of 100 percent when the pressure difference between the pressure of the refrigerant before being introduced into the active pressure drop type

heat exchanger and the pressure of the refrigerant before being introduced into the refrigeration means is defined as 100 percent.

10. The cryogenic refrigerator according to Claim 1, further comprising:
a spirally formed pressure drop passage, in communication with the high pressure passage, and for exchanging heat with a heat exchange medium, the pressure drop passage provided at the active pressure drop type heat exchanger.

11. The cryogenic refrigerator according to Claim 1, further comprising:
a pressure drop passage in communication with the high pressure passage and for exchanging heat with a heat exchange medium, the pressure drop passage provided at the active pressure drop type heat exchanger; and
a resistive element serving as a resistance against a flow of the refrigerant, the resistive element provided at the pressure drop passage.

12. The cryogenic refrigerator according to Claim 1, further comprising:
a passage forming member in communication with the high pressure passage and for forming a pressure drop passage for exchanging heat with a heat exchange medium, the passage forming member provided at the active pressure drop type heat exchanger; and a spacer member provided between the passage forming members for forming a passage where the heat exchange medium flows.

13. The cryogenic refrigerator according to Claim 1, further comprising:
a porous body for forming a pressure drop passage with small bore in communication with the high pressure passage and for exchanging heat with a heat exchange medium, the porous body provided at the active pressure drop type heat exchanger.

14. The cryogenic refrigerator according to Claim 1, further comprising
a pressure drop passage in communication with the high pressure passage and for exchanging heat with a heat exchange medium, the pressure drop passage provided with a plurality of plate members including a penetration bore.

15. The cryogenic refrigerator according to Claim 12, wherein the spacer member includes projections provided at an external surface of a spirally wound tube including the pressure drop passage.

16. The cryogenic refrigerator according to Claim 12, wherein the spacer member includes a wire provided at an external surface of a spirally wound tube including the pressure drop passage.